



Idaho National Laboratory

# RELAP5-3D Development & Application Status

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# Outline

- ***Changes in Version 2.4***
- ***Ongoing and future work***
- ***Current applications at the INL***

# ***Version 2.4 Release September 2006***

## ***New models and improvements to existing models***

- *Compressor Model*
- *Critical Flow Flag*
  - *Junction selection (Ransom-Trapp or Henry-Fauske)*
- *Henry-Fauske Critical Flow*
  - *Eliminate time step sensitivity*
- *Heat Transfer multipliers*
  - *CHF, transition boiling, film boiling*

# ***Version 2.4 Release September 2006***

## ***New models and improvements to existing models (cont'd)***

- ***Thermal Stratification Model***
  - *Compatible with nearly-implicit scheme*
- ***Coolants***
  - *Supercritical water, CO<sub>2</sub>, Helium, Xenon, He-Xe, Molten salts (4)*
- ***Material Properties***
  - *Extended temperatures, traceability to MATPRO*

# ***Ongoing Development***

- ***Code Coupling Modifications***
- ***FORTRAN 90 Conversion***
- ***Code Restructuring***
- ***VHTR Heat Transfer***
- ***Heat Conduction Model***
  - ***2D conduction***
  - ***Alternate coupling to fluid model***

# ***Current Applications at INL***

- ***Next Generation Nuclear Plant***
  - *Very High Temperature Reactor*
  - *Gas Cooled Fast Reactor*
- ***GNEP***
  - *Sodium Cooled Fast Reactor*
- ***MAPLE Production Reactor***
- ***Np/Pu Target Storage Coolability***
- ***ATR Analysis***
- ***Training Workshops***
  - *RPI*
  - *INL*
  - *KAPL*

# *Summary*

- *New modeling capabilities added*
- *Modernization underway*
  - *FORTRAN 90*
  - *Restructuring*
- *Scope of applications expanding*
  - *Generation IV reactor designs*
  - *GNEP*